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Tonsillectomy and Poliomyelitis

During recent months serious consideration has been given to the effect of tonsil operations on susceptibility to infection with the virus of poliomyelitis. Dr. Kenneth F. Maxcy, who is retiring after a very distinguished career as a leader in the field of epidemiology at Johns Hopkins, has summarized the evidence on this point for us. We are grateful for this succinct summary.

In addition to the specific antigen-antibody interaction of poliomyelitis, it has become apparent in the past three decades that certain nonspecific factors and conditions may determine distribution of the virus in the central nervous system and, possibly, also the relative frequency of infections resulting in paralysis. Among those factors which have been considered are: endocrine changes, dietary deficiency, pregnancy, excessive physical activity and fatigue, subcutaneous or intramuscular inoculation of antigenic materials, and tonsillectomy. Evidence of the predisposing or provoking effect of at least the last three is fairly convincing. Our interest here, however, is limited to the last named condition.

Early observations on tonsillectomy and paralytic poliomyelitis were reviewed and summarized by Aycock (1942). From the data then available, there appeared to be a causal relationship between the removal of tonsils and the onset of bulbar poliomyelitis within the time interval corresponding to the incubation period of the disease, approximately one month. Furthermore, it appeared that the relative frequency of occurrence of bulbar, as compared with the spinal form of poliomyelitis, was greater at all ages in persons giving a history of previous tonsillectomy. The increased frequency of the bulbar form in comparison with other forms associated with recent tonsillectomy, has been confirmed by more recent epidemiological studies (John Anderson, 1945; Gaylord Anderson, et al., 1950; Siegal, et al., 1951) and by the results of animal experiments (von Magnus and Melnick, 1948; Sabin, 1938; Faber, et al., 1951). This relationship is explained as due to the fact that virus being present in the throat at the time of the operation passes directly into the central nervous system along traumatized nerve fibers. The second hypothesis, namely, that tonsillectomy at any previous time, i.e., the absence of tonsils, predisposes to the bulbar form of poliomyelitis, is not so easily explained. Nevertheless, the association has received confirmation from several investigators (Lucchesi and LaBoccetta, 1944; Top, 1952; Southcott, 1953; Weinstein, et al., 1954).

The most recent study is that of Anderson and Rondeau (1954) based upon epidemiological histories of 2,669 cases of poliomyelitis gathered during the 1946 outbreak in Minnesota. For all age groups, 71.4 per cent of 535 bulbar cases

gave a history of tonsillectomy at some previous time up to many years, as compared with 28.2 per cent of 936 severe spinal; 36.2 per cent of 908 mild spinal; 34.8 per cent of 299 nonparalytic cases. The results of these studies are singularly consistent in demonstrating that a history of tonsillectomy is from two to three times more frequent in patients with bulbar than it is with patients having spinal or nonparalytic poliomyelitis. The relationship holds when the comparison is made specific for age and sex.

When the comparison was reversed, similar results were obtained (Top, 1952; Weinstein, et al., 1954; Lucchesi and LaBoccetta, 1944). Thus, Anderson and Rondeau (1954) found that 36.6 per cent of previously tonsillectomized cases had bulbar involvement, as contrasted with only 9.4 per cent of those cases not previously tonsillectomized. Stated in different words, the number of bulbar cases observed in the tonsillectomized group was from three or four times as large as the number expected when the rates found in the nontonsillectomized group were applied on an age basis.

The possibility that the association between absence of tonsils and bulbar localization of the virus is due indirectly to some other factor was considered by Anderson and Rondeau. It had been suggested that those who had been tonsillectomized might be drawn from a higher economic level, since their families had the financial means with which to provide for tonsil removal, and that differences in the rate of bulbar involvement might be related to unknown factors associated with economic differences rather than with tonsils. Using the number of persons per room at the usual place of abode as a measure of economic status, Anderson and Rondeau found no difference between the bulbar and the severe spinal cases. So, too, the higher frequency of the bulbar type in tonsillectomized patients did not appear to be related to the frequency of nose and throat infections which prompted the tonsillectomy.

Thus, so far as the evidence goes at present, it appears that the absence of tonsils is in some measure a predisposing condition to bulbar localization of virus. Whether this absence of tonsils increases the risk of converting an immunizing alimentary infection into a paralytic attack is still unknown, nor is it clear how the absence of tonsils weakens resistance, although several explanations have been postulated. Nevertheless, if a tonsillectomized person develops clinically recognizable poliomyelitis, the likelihood of bulbar involvement may be three or four times as great as in one whose tonsils are in situ. This higher proportion of bulbar cases in tonsillectomized persons occurs at all ages regardless of the time elapsed since operation.

Even though the increased risk of bulbar localization of the virus is exceedingly small for the individual, it should be taken into account in considering the indications for tonsillectomy at any season of the year, but especially during the summer months.

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The Psittacosis Problem

During the pandemic of psittacosis in 1929–1930 it is estimated that there were 170 cases of this disease with 33 deaths in the United States. Most of the cases appeared to follow exposure to psittacine birds imported from tropical countries. Later it was discovered that psittacosis was prevalent in domestic parrot-breeding establishments and the Public Health Service in 1932 banned interstate transportation of psittacine birds unless they were certified by the state health authority to be free from psittacosis.

California where most of the aviaries were located at that time initiated a vigorous campaign to rid their bird-breeding establishments of psittacosis. Through a program of inspection, laboratory testing and compensation for birds destroyed because of infection, the aviaries in that state were rendered virtually free of the disease by 1937. Concomittantly, the incidence of the human disease in California and elsewhere in this country declined to a low level. Unfortunately, California was compelled to discontinue its control program because of the expense and inability to obtain cooperation of some bird-breeders.

In 1947 the Public Health Service decided that the certification plan placed in effect in 1932 was unenforceable and adopted new regulations which virtually banned interstate shipment of psittacine birds. In 1952 these controls were lifted and concurrently some of the states and larger cities also removed restrictions on sale of these cage pets. Simultaneously, a great popular demand for shell parakeets or "budgies" developed, so that it is believed that at least several hundred thousand are sold annually. Many of these are raised by back-yard breeders, some of whom are so greedy that it is reported that they sell birds which are so sick that they have been kept alive with antibiotics. It also has been stated that there is an extensive market in birds illegally imported from tropical countries. Since the relaxation of controls there has been a sharp increase in the number of human cases reported from an average of about 30 a year during the period 1945 to 1951 to 135 in 1952 and an estimated 100 in 1953. The reported cases undoubtedly represent only a small proportion of the true incidence, since cases of psittacosis are often designated as "virus pneumonia" or "flu" unless laboratory or epidemiologic studies are conducted.

Fortunately, the fatality rate has been falling and is now estimated to be only about 2 per cent. This decline has been attributed to the use of antibiotics but may also be due to changes in the sources of infection and in the completeness of reporting.

It is a temptation to place the blame for the increased incidence of the human disease on the relaxation of controls. During the past few years, however, it has